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Policies and Research at USDA to Ensure Resilient and Sustainable Agriculture

A USDA/DoS Seminar
London, England
9/28/2010



Five Pillars for the Secretary's Vision

Creating Rural Prosperity

- Increasing access to broadband and continuous business creation
- Developing local and regional food systems
- Capitalizing on climate change opportunities
- Developing renewable energy
- Generating and retaining green jobs through recreation and natural resource restoration, conservation, and management





USDA Strategic Goals

- Help America promote agriculture production and biotechnology exports as America works to increase food security.
- Ensure that all of America's children have access to safe, nutritious, balanced meals
- Assist rural communities to create prosperity so they are self-sustaining, repopulating, and economically thriving
- Ensure our National Forests and private working lands are conserved, restored, and made more resilient to climate change, while enhancing our water resources.





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Research at USDA

REE

- Agricultural Research Service
- Economic Research Service
- National Institute of Food and Agriculture
- (Forest Service)

Foreign Agriculture Service

Animal and Plant Health Inspection Service

Food and Nutrition Services

(Research informs portfolio of others)





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Why this is the right time for a change in research for agriculture

“The lessons of history led the Committee on a New Biology for the 21st Century to recommend that a(n) . . . initiative be put in place and charged with finding solutions to major societal needs: sustainable food production, protection of the environment, renewable energy, and improvement in human health. These challenges represent both the mechanism for accelerating the emergence of a New Biology and its first fruits.”



USDA's Climate Change Strategy Vision

Sustainable agricultural and forestry systems providing high-quality food, feed, fiber, and fuel while reducing greenhouse gas emissions and offering emissions solutions to other economic sectors.

Climate Change Strategy

- **USDA is uniquely qualified to address climate change**
 - **30+ years of research on climate change**
 - **Broad Departmental mission**
 - Research, tech transfer, public land management, technical assistance, communications, education, extension
 - **Extensive relationships for solving complex problems**
 - State Depts. of Agric, universities, private sector, policy makers, farmers-ranchers-foresters, communities

REE Climate Change Strategy

- **MITIGATION**

- Reduce agriculture's greenhouse gas footprint.
- Use agriculture to offset emissions in other sectors of the economy.

- **ADAPTATION**

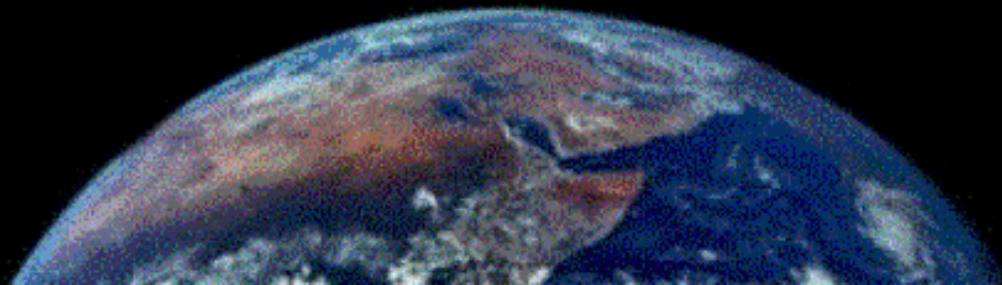
- Avoid the negative impacts.
- Take advantage of the positive effects.
- Increase resilience in agricultural systems.

- **CLIMATE LITERACY, OUTREACH, and DECISION SUPPORT**

- Improve the public's understanding of how agriculture and climate affect each other.
- Increase the application and benefits of USDA science on climate change.

ARS Takes a Risk-Based Approach to Climate Change Research

- **Identify** potential risks and benefits to agriculture that may arise from a changing environment.
- **Quantify** their likelihood and consequences.
- **Adapt** to take advantage of benefits and avoid undesirable consequences.
- **Mitigate** the Nation's net GHG emissions.



ARS Climate Change Research: Mitigation

- Increase C sequestration (land use practices)
- Reduce emissions
 - Nutrient management
 - Animal and waste management
- Reduce GHG intensity (net emissions per unit of commodity produced)

Interactions, Interactions, Interactions

- Soil fertility (other nutrients, N, P, etc)
- Pests - weeds, pathogens
- Ozone
- Soil microbial activity
- Temperature
- Water





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The role of the National Institute of Food and Agriculture is to support research, extension and education, and bring focus to meet society's grand challenges



INVESTING IN SCIENCE | SECURING OUR FUTURE



Refocusing NIFA Research in 2010

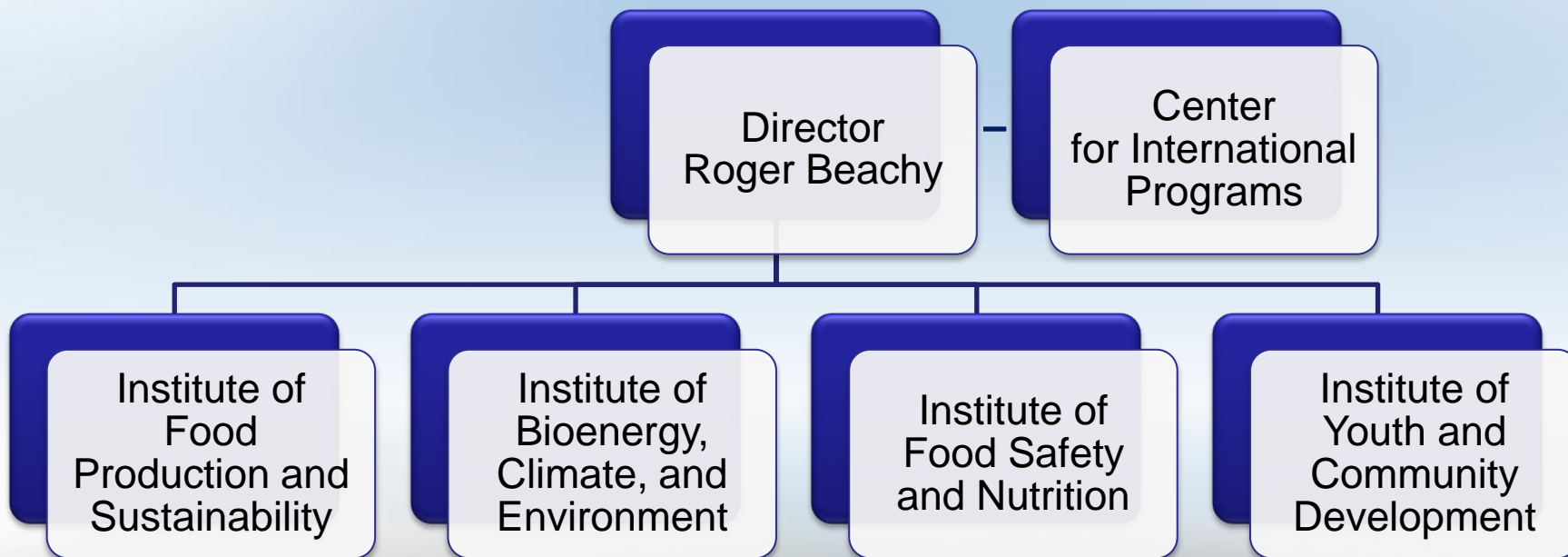
Focuses the outcomes from NIFA-sponsored activities around thematic areas:

1. Climate change
2. Bioenergy
3. Food safety
4. Nutrition and childhood obesity
5. Global food security





PROPOSED STRUCTURE for NIFA



The Energy Challenge



- Develop plants to produce biomass more efficiently
- Plants that produce cellulose that is easier to process
- Adapt microbial enzymes and metabolic pathways for the optimal conversion of cellulose into fuel
- Biotechnology, including genetic engineering will be key to success

The Environment Challenge

- Climate Change
 - Monitoring and modeling: GRACEnet
 - Research to Mitigate and Adapt agriculture
 - Making agriculture “climate neutral”
- Water Security
- Sustainability
- Biotechnology to adapt plants and animals





Climate Change: Mitigation, Adaptation, Climate Education and Extension: 2010

- Cropping systems: maize, small grains; Animal systems: swine, poultry; Forest systems: southern conifers
- Regional Approaches to Climate Change
- National Cereal Germplasm Phenotyping
- Impacts of Climate Change on Animal Health and Production
- Climate Change Mitigation and Adaptation in Agriculture



Sustainable Bioenergy: 2010

- Disease protection of feedstock systems; High value co-product development; Carbon sequestration; sustainable bioenergy production
- Regional Approaches to Sustainable Bioenergy
- Sustainable Bioenergy Research
- Stimulating a New Era of Students and Faculty in Bioenergy
- National Loblolly Pine Genome Sequencing



NIFA's Primary Initiatives

- Focus efforts on high priority issues, including climate change, childhood obesity, biomass/bioproductions
- Ensure agricultural productivity and sustainability, strengthen rural communities, and address global hunger
- Support fundamental science, applied research, and education
- Link scientific discovery, application of sustainable practices, producers; maintain support for SARE and other programs





Some Facts to Consider. . .

- Achieving national goals for production of biofuels are (likely) unachievable without advanced technology/biotechnology
- Adaptation to changing weather patterns requires advanced technologies/biotechnology
- Similar for reducing GHG emissions from agriculture (livestock; crop production)





Sustainability: A long-held Policy of US Agriculture

1. Sustainable agriculture: economically sound; renews/builds the agro-environment; is socially acceptable
2. Sustainability is defined in scientific terms and has measurable outcomes (retain/enrich soils; reduce runoff/GHGs from farms; improved ground water, etc)
3. USDA research workers are leaders in natural resource management, clean air and water (long terms studies)





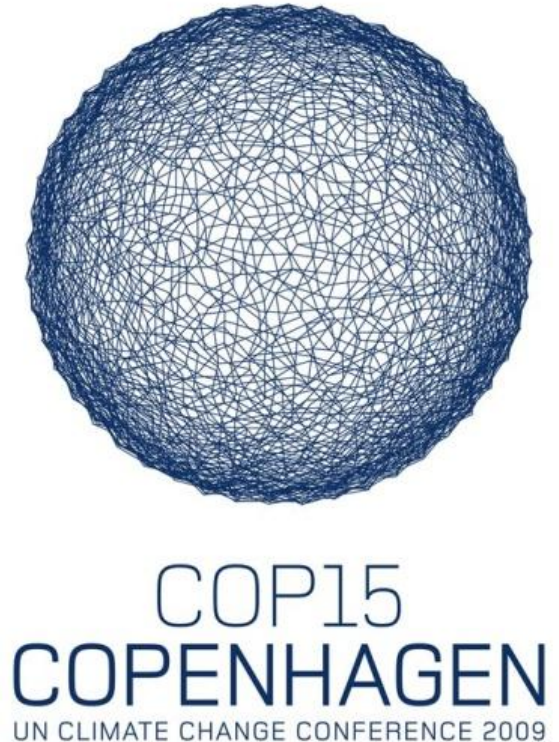
Building Partnerships and Institutions to Achieve Global Food Security

- USG has a renewed commitment to global food security, including through building capacities
- Strengthening institutions in food and agriculture
- USDA and USAID to play central roles
- Opportunities for public and private sector to partner
- Call for other country commitments



The Global Research Alliance on Agricultural Greenhouse Gases

- Proposed in 2009 by New Zealand
- Development in partnership with the United States
- 21 countries at COP15 in Copenhagen endorsed a Joint Ministerial Statement on the Establishment of a Global Research Alliance on Agricultural Greenhouse Gases



Current Members as of March 30, 2010

- 
- The background of the slide features a stylized world map in shades of blue and green. In the foreground, there are several black silhouettes of people standing and interacting, some appearing to shake hands. The overall theme is global and collaborative.
- Argentina
 - Australia
 - Canada
 - Chile
 - Colombia
 - Denmark
 - France
 - Germany
 - Ghana
 - India
 - Indonesia
 - Ireland
 - Japan
 - Malaysia
 - Mexico
 - Netherlands
 - New Zealand
 - Norway
 - Peru
 - Spain
 - Sweden
 - Switzerland
 - United Kingdom
 - United States
 - Uruguay
 - Vietnam

The Global Research Alliance on Agricultural Greenhouse Gases *in brief*

- **Understand GHG emissions from agriculture**
- **Improve measurement and estimation of GHG emissions and C sequestration**
- **Develop ways to reduce emissions**
- **Develop ways to increase C sequestration**
- **Mitigate GHGs while sustaining or enhancing productivity and resilience as climate changes**
- **Transfer new knowledge and technology to farmers/land managers worldwide**
- **Build scientific capacity in developing countries via partnerships**

Proposed Structure: Three International Research Projects



Crop Systems



Paddy Rice



Livestock Systems

Nano-Technology as a tool . . .

- Grand societal challenges
 - Agriculture and food in the society
- Nanotechnology opportunities for agriculture and food – plant production and products
- Responsible deployment of nanotechnology
- Broad societal issues including education, public perception and acceptance, technology drivers
- Convergence of bio-, info-, nano- and cogno-technologies



Who are the Next Generation of 'Agricultural Scientists'?

- Classical and advanced agricultural sciences
- Non-agricultural scientists (physicists, chemists, informaticians, nutritionists, biomedical scientists)
- Social, economic, policy making, communications

